Technical Report #3

Surface Erosion And Mass Wasting Assessment and Management Strategies for Plum Creek's Native Fish Habitat Conservation Plan

Overview

Erosion is defined as the movement of soil or rock by water, wind, ice, or gravity. Although erosion takes place naturally, the speed and amount of erosion can be increased by human activities, such as grazing, logging, or farming. Technical Report #3 has four objectives:

1. Summarize the impacts of historical logging and road construction practices in the Pacific Northwest
2. Discuss current regulations and the protection they provide
3. Evaluate the effectiveness of current Best Management Practices (BMPs) in controlling erosion
4. Present general strategies and opportunities to better address erosion in Plum Creek watersheds

Key Points

The following points summarize the key findings of this Technical Report:

- BMPs and Streamside Management Zones (SMZs) effectively control surface erosion and sediment delivery from hillslope sources.
- Roads produce nearly all management-derived surface erosion and sediment delivery to streams. Adding drainage to roads can substantially reduce sediment delivery.
- Mass wasting is not a dominant erosional process in the project area but can be locally significant.

Supporting Technical Information

Two basic types of erosion were evaluated in Technical Report #3: surface erosion and mass wasting. **Surface erosion** occurs when water flows across a soil surface and fine particles are carried down the slope and into the stream. For the purpose of this technical report, surface erosion was partitioned into two forms: hillslope erosion and road erosion. **Mass wasting** (landsliding) occurs when soil is violently removed from the hillside as a unit. This mass movement of the soil is often triggered by too much water on a steep slope, which allows gravity to overcome the forces that would otherwise keep the soil on the slope.

The salmonid species addressed in Plum Creek's Native Fish Habitat Conservation Plan (NFHCP) and in the Environmental Impact Statement depend on gravel stream bottoms for spawning and rearing. Excessive sediment can limit this part of salmonid habitat. It is important for Plum Creek scientists to understand the most effective way to preserve spawning and rearing habitat.

Sediment Contribution from Hillslopes

Based on erosion studies in 15 watersheds, surface erosion from hillslopes was rarely observed when BMPs were implemented and streamside vegetative buffers were maintained. This finding agrees with other scientists' findings and state audits. While hillslope erosion has not been shown to be a substantial process of concern in the Project Area generally, it can be important in local areas.

Sediment Contribution from Roads

Roads produce nearly all of the management-derived surface erosion to streams. Most of this sediment delivery occurs at stream crossings and from roads adjacent to streams.

Because most roads in the Project Area were constructed prior to the advent of BMPs, opportunities exist to reduce sediment delivery to streams. A review of 11 analyses found that sediment delivery could be reduced by 25 to 85 percent by adding drainage around stream crossings.

Information in the technical report can be used to assess the benefits of adding drainage to streams as part of the NFHCP. Information is also provided that can also be used to assess the impacts of additional road construction.

Mass Wasting in Plum Creek Watersheds

Mass wasting (landsliding) is the dominant form of erosion in many forested watersheds in the Pacific Northwest. However, rates of mass wasting in the Project Area are substantially lower than in western Washington and immediately east of the Cascade Mountains. Although the rates are lower, mass wasting can be a locally significant erosional process in the Project Area.

Conclusion and Implications

Increased sediment in streams has an adverse impact on the habitat of many salmonid species. Human-caused erosion can increase sediment delivery to these streams. Surface erosion and mass wasting rates can be effectively minimized by implementing BMPs and SMZs.